REPORT

ON THE

Cawnpore Experimental Farm

FOR THE

Kharif and Rabi Seasons, 1893-94.

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Dated Cawnpore, the 1st September 1894.

FROM

F. E. TAYLOR, ESQ.,

OFFG. DIRECTOR OF LAND RECORDS AND AGRICULTURE,

NORTH-WESTERN PROVINCES AND OUDH,

To

THE CHIEF SECRETARY TO GOVERNMENT,

NORTH-WESTERN PROVINCES AND OUDH.

SIR,

I HAVE the honor to submit the report on the Government Experimental Farm at Cawnpore for the year 1893-94. The Farm is under the control of the Assistant Director, Saiyid Muhammad Hadi, and the report has been written by him. The delay in the submission of the report is due to it having been found necessary by my predecessor to return the first draft of the report to the Assistant Director for explanations on certain points.

2. The permanent Farm Superintendent, Saiyid Ali Husain, returned from Poona where he had been studying at the College of Science, and resumed charge of his duties on 1st October 1893. The weighing of manures at the time they were applied to the land and of the produce of the kharif and rabi crops were carried out in the presence of the Assistant Director.

3. It is not necessary for me to give a detailed review of the conduct during the year of the experiments carried out on the Farm. I would, however, note that some of the plots suffer from water-logging when much rain falls within a limited period. This is noticed in several parts of the report and I also saw the same thing on my recent visits to the Farm. It is evident that if one plot habitually suffers from excess of moisture the crop on it must be habitually poor, with the result that any manure applied to such a plot will fail to give results capable of comparison with the effects of other manures applied to better situated plots. The Assistant Director will be asked to make proposals for improving the drainage of the lower lying parts of the Farm.

4. The Arab stallion which was sent to the Farm in May 1891 as well as the two brood mares are still used for ploughing. The stallion served 46 mares during the year. The result of the coverings is not yet known in 32 cases; of the remainder eight were failures, five mares have foaled and one appears to be in foal. One of the brood mares foaled about five months ago.

5. The distribution of seeds and implements was continued during the year and the number of applications for information on agricultural questions has increased.

I have the honor to be,

SIR,

Your most obedient servant,

F. E. TAYLOR,

Offg. Director.

REPORT

ON THE

CAWNPORE EXPERIMENTAL FARM,

FOR THE

KHARIF AND RABI SEASONS, 1893-94.

General character of the season.—The year under report was not a good agricultural year on the whole. The rains in July, August and September were excessive and the total rainfall was considerably above the normal. The following statement shows the amount and distribution of rainfall during the year :—

Months.	Rainfall.			Rainy days.		
	1892-93.	1893-94.	Normal.	1892-93.	1893-94.	Normal.
April 1893	...	...	·11	...	...	1
May „	...	0·62	·52	...	3	1
June „	3·90	6·00	3·11	6	10	4
July „	10·75	21 45	10 25	16	16	12
August „	12 25	11·14	10·08	18	9	12
September „	3·50	8 80	4·33	5	8	7
October „	...	1·17	1·22	...	3	2
November „	·02	0·24	...	1	1	...
December „	...	0·00	·34	...	...	1
January 1894	·90	0·62	·64	4	2	1
February „	·40	0·56	·28	2	3	1
March „	...	0·02	·25	...	...	1
Total ...	31·72	50 62	31·13	52	55	42

Generally speaking all Kharif crops except maize were injured more or less by the excess of rain which, however, caused greater damage to the rabi crops. The American and Khandesh varieties of cotton suffered particularly during the Kharif season. The effects of weather have been fully noticed under the various experiments described hereafter.

2. The subjoined table compares the average and maximum yield of wheat and maize during the year under report with that in the two preceding years :—

Statement showing maximum and average yield of wheat and maize.

Year.	Average yield per acre.		Maximum yield per acre.	
	Wheat.	Maize.	Wheat.	Maize.
	lb.	lb.	lb.	lb.
1893-94	1,232	1,941	2,184	3,551
1892-93	1,732	1,123	2,777	3,073
1891-92	1,133	1,730	2,089	1,815

3. The experiments tried at the farm are classed as 'Permanent' and 'Temporary.'

The 'Permanent' experiments are carried on year after year on the same plots of land and with the same sort of treatment.

The 'Temporary' experiments are so called with reference to their duration and the land used.

The 'Permanent' experiments are directed to show the effects of—

(*a*) Certain nitrogenous and non-nitrogenous manures on maize and wheat;

(*b*) Deep and shallow ploughing on wheat;

(*c*) Certain green manures on wheat.

The temporary experiments are tried in the kharif chiefly with cotton and indigo, and in the rabi with oats, potatoes, and gram.

A detailed account of these will be found in the succeeding paragraphs.

KHARIF SEASON EXPERIMENTS.

4. Kharif Statements I and II.—*Experiment with maize.*—This experiment is carried on in two series of 13 plots each. In the 1st which is called the 'Standard Series' maize is sown year after year without any change of treatment. In the 2nd or 'Duplicate Series' maize alternates with wheat, and is sown about three months after the removal of the wheat crop, the object being partly to verify the results of the 'Standard Series' and partly to determine the economy of growing maize in rotation with wheat. The manure applied to one plot of the Standard Series is also applied to the corresponding plot of the Duplicate Series.

5. The 'Standard Series' plots were watered with canal water on the 30th and 31st May in order to soften the soil for the final ploughing, but before the 'Duplicate' plots could be treated similarly, rains fell early in June dispensing with the necessity of adopting similar treatment for them. Seed was sown behind the country plough on the 6th and 7th June and germinated in a week. A heavy shower of rain fell on the 18th of July causing great accumulation of water in all the fields. It was drained off from all the plots except Nos. 3, 4 and 9 of the Duplicate Series from which it could not be got rid of owing to their low situation. Hence these plots were damaged and gave a poorer outturn comparatively.

6. An unusually heavy storm on the 9th July knocked down some plants in the Standard Series, but the damage was not considerable. The season was otherwise very favorable for maize.

7. The following statement shows the results of the Standard Series:—

KHARIF STATEMENT No. I.—*Standard Series.—Manure experiment with maize.*

Number of plot.	Manure applied per acre.	Outturn per acre.				Increase or decrease per acre as compared with unmanured plot.			
		Grain.		Stalks.		Grain.		Stalks.	
		Average of four previous years.	Year under report.	Average of four previous years.	Year under report.	Average of four previous years.	Year under report.	Average of four previous years.	Year under report.
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
1	Cow-dung, 180 maunds + bone dust, 4½ maunds.	1,010	2,583	5,965	10,176	+532	+937	+2,883	+3,061
2	Cow-dung, 180 maunds + gypsum, 3 maunds.	1,219	2,553	5,218	10,781	+741	+907	+2,136	+3,666
3	Cow-dung, 180 maunds ...	968	1,906	4,811	8,893	+490	+260	+1,729	+1,778
4	Ashes of 180 maunds of Cow-dung	681	1,307	5,009	9,559	+203	—339	+1,927	+2,444
5	Saltpetre, 3 maunds	735	1,646	4,452	9,559	+257	...	+1,370	+2,444
6	Saltpetre, 3 maunds + bone superphosphate, 3 maunds.	1,025	2,468	3,981	10,345	+547	+822	+899	+3,230
7	Sheep-dung, 180 maunds + bone dust, 4½ maunds.	1,259	3,291	5,662	12,657	+781	+1,645	+2,580	+5,542
8	Ashes of 180 maunds of Cow-dung + Saltpetre, 3 maunds.	989	3,122	5,551	10,866	+511	+1,476	+2,469	+3,751
9	Poudrette, 180 maunds ...	1,071	2,638	6,522	8,494	+593	+992	+3,440	+1,379
10	Sheep-dung, 180 maunds ...	995	3,055	6,649	10,466	+517	+1,409	+3,567	+3,351
11	Saltpetre, 3 maunds + bone dust, 4½ maunds.	835	1,906	5,351	9,111	+357	+260	+2,269	+1,996
12	Sheep-dung, 180 maunds + gypsum, 3 maunds	1,189	3,013	4,971	11,447	+711	+1,366	+1,889	+4,332
13	Unmanured	478	1,646	3,082	7,115	...	...	...	...

Note.—In 1888 the maize crops failed altogether: that year has therefore been left out of account in striking averages.

8. Sheep-dung mixed with bone dust has given the highest outturn. Ashes of cow-dung and saltpetre rank next, showing the unquestionable value of the mixture not yet fully known to the common cultivator. The results of the mixture have been equally favorable in the rabi season.

Poudrette has acted more effectively than (*a*) cow-dung and (*b*) the latter mixed with bone dust and with gypsum. The addition of concentrated manures to cow-dung has naturally had a more beneficial effect upon the yield than cow-dung alone. Saltpetre alone has given poor results in both the series as usual being capable of supplying only nitrogen and potash, but its value as stated above is much enhanced by the addition of ashes to it. Its property of too quick decomposition in the presence of abundance of moisture apparently renders it an unprofitable manure for crops grown during the rains, and, being freely soluble in water, it is apt to be washed out of the reach of plants.

9. The following statement shows the outturn, &c. of the Duplicate Series :—

KHARIF STATEMENT No. II.—*Duplicate Series B.—Manure experiment with maize.*

Number of plot.	Manure applied per acre.	Outturn per acre.				Increased or decreased outturn per acre, as compared with the unmanured plot.			
		Grain.		Stalks.		Grain.		Stalks.	
		Average of four previous years.	Year under report.	Average of four previous years	Year under report.	Average of four previous years.	Year under report.	Average of four previous years.	Year under report.
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
4	Cow-dung, 180 maunds + bone-dust, 4½ maunds.	1,098	877	6,204	4,646	+581	+91	+2,284	−1,416
5	Cow-dung, 180 maunds + gypsum, 3 maunds.	971	1,421	6,401	6,026	+454	+635	+2,481	−36
3	Cow-dung, 180 maunds ...	862	1,543	4,955	6,836	+345	+797	+1,035	+774
7	Ashes of 180 maunds of cow-dung	820	403	5,197	8,276	+303	−383	+1,277	+2,214
1	Saltpetre, 3 maunds ...	671	1,531	4,274	7,744	+154	+745	+354	+1,682
9	Saltpetre, 3 maunds + bone superphosphate, 3 maunds	1,009	974	4,026	5,953	+492	+188	+106	−109
8	Sheep-dung, 180 maunds + bone dust, 4½ maunds.	1,155	1,551	7,244	6,558	+638	+765	+3,324	+496
13	Ashes of 180 maunds of cow-dung + saltpetre, 3 maunds.	1,042	1,875	5,224	10,621	+525	+1,089	+1,304	+4,559
12	Poudrette, 180 maunds ...	1,406	2,111	6,479	12,644	+889	+1,325	+2,559	+6,582
6	Sheep-dung, 180 maunds ...	1,291	2,637	5,330	8,760	+774	+1,852	+1,410	+2,698
2	Saltpetre, 3 maunds + bone dust, 4½ maunds.	846	1,652	5,092	7,575	+329	+866	+1,772	+1,513
10	Sheep-dung, 180 maunds + gypsum, 3 maunds.	1,143	1,343	6,424	7,393	+626	+557	+2,504	+1,331
11	Unmanured	517	786	3,920	6,062	...	...	...	...

In this series of plots the yield is usually much inferior as compared with the Standard Series owing to the fact that the land gets only about two months' rest between the removal of the previous wheat crop and the sowing of the maize, whereas in the Standard Series there is a fallow of about 8 months before the next crop of maize is sown. Among these plots sheep-dung and poudrette have given the two best results, and the mixture of saltpetre and ashes also produced a fairly good yield as in the Standard Series. Plots 4 and 9 suffered particularly from stagnation of water.

10. It will be noticed that the plots to which bone dust was applied have given a very much higher outturn in the Standard Series than in the Duplicate Series. This is due to the fact that bones require a long time to decompose, and therefore a greater portion of the residue left by one crop of maize in the Standard Series becomes fit for use of the succeeding crop by slow decomposition during the long fallow of 8 months, while in the case of the Duplicate Series, only a smaller portion of the residue left by the previous wheat crop becomes available for the succeeding maize crop, the period of fallow between the wheat and the maize being of only 2 months.

11. The financial results of the last two experiments are shown in the following table :—

KHARIF STATEMENT IIA:—*Shewing Financial results.—Manure experiment with maize.*

Manure applied per acre.	Cost of manure per acre.	Standard Series. Cost of cultivation (including rent, seed, labour, &c.) per acre.	Total cost of cultivation per acre.	Value of produce per acre in 1893-94, @ 65 and 492 lbs. the rupee of grain and straw, respectively.	Net profit or loss.	Order according to profit.	Duplicate Series. Cost of cultivation (including rent, seed, labor, &c.) per acre.	Total cost of cultivation per acre.	Value of produce per acre in 1893-94, @ 65 and 492 lbs. the rupee of grain and straw, respectively.	Net profit or loss.	Order according to profit.
	Rs. a.		Rs. a.	Rs. a.	Rs. a			Rs. a.	Rs. a.	Rs. a.	
Cow-dung, 180 maunds + bone dust, 4½ maunds	16 1		32 9	60 7	+27 14	VII		32 9	22 15	− 9 10	XII
Cow-dung, 180 maunds + gypsum, 3 maunds	10 10		27 2	61 3	+34 1	VI		27 2	34 2	+ 7 0	VIII
Cow dung, 180 maunds ...	5 6		21 14	47 6	+25 8	VIII		21 14	39 2	+17 4	IV
Ashes of 180 maunds of cow-dung,	5 6		21 14	39 9	+17 11	XI		21 14	23 0	+ 1 2	XI
Saltpetre, 3 maunds	9 0		25 8	44 12	+19 4	X		25 8	39 5	+13 13	V
Saltpetre, 3 maunds + bone superphosphate, 3 maunds ..	30 0		46 8	59 0	+12 8	XII		46 8	27 2	−19 6	XIII
Sheep-dung, 180 maunds + bone dust, 4½ maunds	16 1	Rupees 16-8 per acre.	32 9	76 5	+43 12	I	Rupees 16-8 per acre.	32 9	37 3	+ 4 10	X
Ashes of 180 maunds of cow-dung + saltpetre, 3 maunds ...	14 6		30 14	70 1	+39 3	IV		30 14	50 7	+19 9	III
Poudrette, 180 maunds ...	5 6		21 14	58 13	+36 15	V		21 14	58 3	+36 5	II
Sheep-dung, 180 maunds ...	5 6		21 14	68 4	+42 6	III		21 14	58 6	+36 8	I
Saltpetre, 3 maunds + bone dust, 4½ maunds	19 11		36 3	47 13	+11 10	XIII		36 3	40 13	+ 4 10	IX
Sheep-dung, 180 maunds, + gypsum, 3 maunds	10 10		27 2	69 10	+42 8	II		27 2	35 11	+ 7 9	VII
Unmanured	...		16 8	39 12	+23 4	IX		16 8	24 6	+ 7 14	VI

The results vary considerably as compared with those of the Standard Series, and the dissimilarity is due mainly to the fact that during the twelve months (October 1892 to September 1893), greater drain was made upon the Duplicate plots by raising 2 crops, *viz.*, one of wheat and the other of maize, while the Standard plots yielded only one (maize).

12. Miscellaneous manure experiment with maize.—The object of this experiment is to determine the comparative effect of certain animal manures and saltpetre on maize. The plots underwent the same tillage operations as last year and were sown on 7th June at the rate of 12lbs. of seed per acre. Plot 7 was damaged considerably from accumulation of water on the 9th of July, which could not be drained off owing to its low situation. Plot 6 suffered for the same reason but to a less extent.

13. The subjoined table gives the outturn of each plot during the year, and the average yield of the eight years during which the experiment has been under trial :—

KHARIF STATEMENT No. III.

Serial number.	Manure applied per acre.	Outturn per acre. Grain. Average of last 8* years.	Grain. Year under report.	Stalk. Average of last 8* years.	Stalk. Year under report.	Increased or decreased outturn per acre as compared with the unmanured plot. Grain. Average of last 8* years.	Grain. Year under report.	Stalk. Average of last 8* years.	Stalk. Year under report.
		lb.	lb.	lb	lb	lb.	lb.	lb.	lb.
1	Woollen refuse, 120 maunds and lime, 12 maunds.	2,014	2,862	8,139	12,052	+1,356	+2,463	+4,634	+8,023
2	Sheep-dung, 120 maunds	1,880	3,551	7,247	12,765	+1,222	+3,152	+3,742	+8,736
3	Cow-dung, 120 maunds...	1,229	1,658	5,487	7,333	+571	+1,259	+1,932	+3,304
4	Poudrette, 120 maunds...	1,665	2,190	5,745	7,817	+1,007	+1,791	+2,240	+3,788
5	Horse-dung, 120 maunds	1,401	2,487	6,006	7,829	+743	+2,088	+2,501	+3,800
6	Pigs-dung, 120 maunds...	1,401	2,160	6,300	7,441	+743	+1,761	+2,795	+3,412
7	Saltpetre, 3 maunds ...	1,075	611	5,324	4,562	+417	+212	+1,819	+533
8	Unmanured	658	399	3,505	4,029	...	...	...	...

*This includes the year under report.

During the year under report sheep-dung has given the best results as last year. Plots 2, 3 and 4 of this series have in most of the previous years yielded greater outturn than the corresponding plots of the Standard Series, owing to the fact that they enjoy the special advantage of being situated on a higher level, and water does not stagnate in them.

14. The subjoined table gives the financial results of the experiment showing that among manures ordinarily available sheep-dung and poudrette are almost equally economical. The net profit is based on the average outturn of the present and seven preceding years.

KHARIF STATEMENT No. IIIA.—*Showing financial results of miscellaneous manures tried on maize.*

Serial number.	Manure applied per acre.	Cost of manure per acre.	Cost of cultivation, rent, seed, &c., per acre.	Total cost per acre.	Value of the average outturn per acre for the last 8* years.	Net profit.	Order as regards financial result.
		Rs. a. p	Rs. a p	Rs. a p	Rs. a. p	Rs a. p.	
1	Woollen refuse, 120 maunds and lime, 12 maunds	3 9 0	16 8 0	20 1 0	47 8 0	27 7 0	I
2	Sheep dung, 120 maunds ...	3 10 0	16 8 0	20 2 0	35 5 0	15 3 0	III
3	Cow-dung, 120 maunds ...	3 10 0	16 8 0	20 2 0	26 1 0	5 15 0	VI
4	Poudrette, 120 maunds ...	4 13 0	16 8 0	21 5 0	36 14 0	15 9 0	II
5	Horse dung, 120 maunds ...	3 10 0	16 8 0	20 2 0	31 1 0	10 15 0	V
6	Pigs-dung, 120 maunds ...	3 10 0	16 8 0	20 2 0	31 11 0	11 9 0	IV
7	Saltpetre, 3 maunds ...	9 0 0	16 8 0	25 8 0	27 6 0	1 14 0	VII
8	Unmanured ...	...	16 8 0	16 8 0	17 3 0	0 11 0	VIII

*This includes the year under report.

15. This experiment has been given up at the suggestion of the Agricultural Chemist, as, he said, it was not customary with the cultivators to store up the dungs of various animals separately, and the conducting of such experiment would not therefore be of much practical value. The following are the general conclusions drawn from the results of the past eight years :—

(1) That woollen refuse mixed with lime acts more beneficially than any other animal manure;

(2) That sheep-dung is more suitable for maize than the dung of any other animal;

(3) That poudrette is also a valuable fertiliser for the crop;

(4) That horse-dung and pig's-dung are both superior to cow-dung.

16. Manure experiment with country cotton :—The object of this experiment, which is conducted on 6 plots of 400 square yards each, is to ascertain the effect of different manures on country cotton. The plots were manured on the 20th of March and sown on the 4th June at 24lbs of seed per acre.

The results are given in the following table :—

KHARIF STATEMENT No. IV.—*Manure experiment with cotton.*

Serial number.	Manure applied per acre.	Outturn per acre.				Increased or decreased outturn per acre as compared with the unmanured plot.			
		Cleaned cotton.		Seed.		Cleaned cotton.		Seed.	
		Average of last five* years.	Year under report.	Average of last five* years.	Year under report.	Average of last five* years.	Year under report.	Average of last five* years.	Year under report.
		lb.	lb	lb.	lb.	lb	lb	lb.	lb·
1	Fresh silt from canal, 500 maunds.	156	243	302	443	+33	+109	+81	+175
2	†Kainit, 4 maunds and gypsum, 4 maunds.	176	231	336	421	+53	+97	+115	+153
3	Farm yard manure, 180 maunds and gypsum, 1 maund 14½ seers.	202	236	404	472	+79	+102	+183	+204
4	Farm-yard manure, 180 maunds, and kainit, 1 maund 14½ seers	199	192	379	401	+76	+58	+158	+133
5	Woollen refuse, 1.0 maunds.	257	171	472	341	+134	+37	+251	+73
6	Unmanured	123	134	221	268	...	...	..	...

* The years 1889 90 and 1892-93 in which the crop failed owing to unfavorable season, have not been taken into account in striking averages.

† Kainit is a potassic manure containing sulphate and chloride of potassium, also chloride and sulphate of magnesium and cholride of sodium.

NOTE.—The cost of cultivation may be taken at the rate of Rs. 26-12 per acre, including all charges except that on account of manure. The value of the outturn is calculated at 5lb the rupee of cotton fibre, and @ 60lb the rupee of seed. At these rates, the profit on plots I, II, and III would be Rs. 29-4, Rs. 26-7, and Rs. 28-1. The average profit on these plots for the last five years would respectively be Rs. 9 8, 14-1 and 20-5.

17. During the year under report the yield was unusually high. Owing to the exceptionally early advent of the rains (about the end of May), the crop was sown on the 4th of June, that is, about a fortnight earlier than the usual time for sowing country cotton. The plants therefore received such a fair start as to escape the effects of unfavorable weather which followed and injured other plots of cotton enumerated in Kharif Statements V(*b*) and VI *infra*. The plot treated with woollen refuse, however, did not give the highest outturn as in the previous years, for the crop in this plot advanced very rapidly in growth of foliage, and owing to the shade the soil remained too damp at a time when excess of moisture was decidedly injurious, causing an attack of the insect *jhanjha*, and imperfect development of the bolls. The unusually high yield from the canal silt may be due to the very high percentage of organic matter in the silt obtained and applied during the year.

18. Experiment in early and late sowing :—The object of this experiment is to determine the effect of early and late sowing on maize and cotton, as well as to ascertain the comparative outturn of different varieties of the latter.

The following tables give the result of the experiment:—

KHARIF STATEMENT NO. V(*a*).—*Early and late sowing of maize.*

Number of field.	Description of sowing.	Month and date of sowing.	Outturn per acre.			
			Grain.		Stalks.	
			Averge of last five years.	Year under report.	Average of last five years.	Year under report.
			lb.	lb.	lb.	lb.
42	Sown early ...	May 4th ...	1,703	1,825	5,356	5,782
26	Sown late ...	June 5th ...	1,342	1,591	4,784	5,329

N. B.—The cost of cultivation in the case of late sowing is Rs. 16-8 per acre including rent, seed, labour, &c, while in the case of early sowing it is increased by Rs. 6 on account of irrigation. The value of the produce is put at Re. 1 per 65 lb. of grain and Re. 1 per 492 lb. of stalk for fodder. According to these rates the outturn of the early sown plot during the year under report was worth Rs. 39-15, and that of late sown Rs. 35-5, the profits on the plots being respectively Rs. 17-7 and Rs. 18-13. The average profit for the last five years was, in the case of early sown plot, Rs. 16-8, and in the case of late sown plot, Rs. 13-13.

KHARIF STATEMENT NO. V(*b*) *early and late sowing of cotton.*

Number of field.	Time of sowing and variety of cotton sown.		Outturn per acre.			
			Cleaned cotton.		Seed.	
			Average of last two years.	Year under report.	Average of last two years.	Year under report.
			lb.	lb.	lb.	lb.
17	Sown before rains	Varadhi ...	107	55	259	63
		Bani	90	35	220	58
		Dharwari ...	154	22	373	78
		Barodha ...	153	29	343	100
		Louisiana ...	150	42	350	126
		Jari	89	55	210	128
		Country ...	163	114	339	227
*A.C. Series ...	Sown after rains	Varadhi	60	113	123	128
		Bani	41	54	85	89
		Dharwari ...	76	37	164	130
		Barodha... ...	46	43	101	156
		Louisiana ...	36	54	85	162
		Jari	48	64	115	150
		Country ...	67	74	137	146

* "A.C." is an arbitrary name given to the plot.

As in previous years the early sown crop of maize gave a higher outturn than the one sown late.

The cotton crop in the early sown plots was severely damaged by the larvæ of an insect locally called *jhanjha*. Though the grubs were destroyed by sprinkling soap-water and tobacco decoction, yet the crop could never recover its full vitality, and the yield was therefore very poor, contrary to previous years.

19. Experiment with different varieties of imported cotton seed.—This experiment was started in 1888 to ascertain whether certain foreign varieties of cotton can be grown successfully in this part of the country. The tillage and other operations were similar to last year's.

The following table shows the outturn of cleaned cotton and seed during each year since the commencement of the experiment:—

KHARIF STATEMENT No. VI.—*Outturn of Foreign Cotton.*

Serial number.	Name of cotton.	Produce per acre.													
		1888-89.		1889-90.		1890-91.		1891-92.		1892-93.		Average of the five years 1888-89 to 1892-93.		1893-94.	
		Cleaned Cotton.	Seed.	Cleaned Cotton.	Seed.	Cleaned Cotton.	Seed.	Cleaned Cotton.	Seed.	Cleaned Cotton.	Seed.	Cleaned Cotton.	Seed.	Cleaned Cotton.	Seed.
		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
1	Upland Georgian,	111	235	160	365	103	228	54	131	86	171	103	226	34	102
2	Tree Cotton ...	138	332	148	354	115	251	82	181	100	201	117	264	21	71
3	Louisiana ...	111	263	194	457	126	319	50	128	192	223	135	278	35	77
4	Garo Hill ...	97	263	194	308	91	137	103	186	98	217	117	222	86	157
5	Hybrid ...	166	249	183	445	108	263	55	138	160	288	133	277	38	83
6	Sea Island ...	83	207	194	514	91	251	54	135	182	363	121	294	32	70
7	Egyptian ...	97	235	194	434	80	194	65	162	155	309	118	267	15	90
8	Hinganghat ...	9	221	183	457	103	251	64	158	153	306	102	279	30	66
9	S. B. Mexcy ...	24	48	180	320	60	100	29	64	73	134	73	133	33	99
10	Shine's Early Prolific.	24	48	140	280	40	100	18	43	91	184	63	131	23	71
11	Jone's Improved,	24	48	180	360	60	120	26	58	41	93	66	136	66	97

20. The yield of each plot was very poor during the year under report. This is due to two reasons, *viz.*:—

(1) The crop was attacked by the insect locally called *jhanjha*. Specimens of the grub (larvæ) were sent to the Calcutta Museum, but could not be identified. As a practical method of getting rid of the grubs a solution of soap was syringed over the plants, and after a week tobacco decoction was sprinkled over the leaves. These measures resulted in complete destruction of the grubs, but the crop could never regain sufficient vigor.

(2) The untimely and frequent rains in the cold weather prevented full development of the bolls and spoilt the quality of fibre in those that burst while the weather was rainy.

21. Samples from the Farm produce of all these varieties were sent to two experts (Managers of the Muir Mills Company and the Cotton Mills Company, Cawnpur) for opinion as to quality, and their opinion together with my remarks on each was forwarded to the Agricultural Chemist. The Agricultural Chemist and myself having agreed

upon the exclusion, from the experiment, of the following varieties, their cultivation will be discontinued :—

(1) Upland Georgian
(2) S. B. Mexcy.
(3) Jone's Improved.
(4) Shine's Early Prolific.

22. Steps are being taken to obtain fresh seed from America of the American varieties retained in the experiment. Fresh seed of the " Garo Hill " has already been obtained from Assam to be tried next season, and that of Hinganghat will be obtained from the Central Provinces.

23. The opinions of the experts and my remarks referred to above are given in the following statement :—

Serial number.	Name of cotton.	Opinion of the Managing Director of the Muir Mills Co., Cawnpore.	Opinion of the Managing Director of the Cotton Mills Co, Cawnpore.	Remarks by the Assistant Director, Land Records and Agriculture, North-Western Provinces and Oudh.
1	Upland Georgian,	A very fine staple cotton, but staple short as compared with other varieties—what might be called a medium variety.	No remarks ...	Should be rejected as both the yield and the quality are poor.
2	Tree cotton ...	An exceedingly fine stapled cotton, some staples as long as 1¼ inches, clean, but seeds appear abundant.	Ditto ...	I shall grow this variety next season from the seed we have got at the Farm, but fresh seed will be ordered from America
3	Louisiana ...	A fine staple but considerable irregularity in length, the seeds in this variety also abundant.	Ditto ...	Ditto ditto This is worth giving further trials
4	Garo Hill ...	A somewhat woolly harsh cotton, staple varies from ½ to 1 inch fibres.	Garo Hill is a short staple (¾") and something like our Madhogarh cotton.	This is one of the best varieties of Indian Cotton. I have obtained some fresh seed this year from Garo Hill (Assam) and they will be sown in the next season.
5	Hybrid ...	A nice fine staple silky cotton somewhat similar to Khandesh staple medium.	No remarks ...	Cultivation to be continued.
6	Sea Island ...	A very silky fine staple cotton, some of the fibres over 1¼ inches long used to be considered the finest cotton in the world with a mean staple of 1·8 inches, the Edisto island variety having staple over 2" long.	Is undoubtedly the finest cotton having a staple 1¾" long and is a fine soft yet strong fibre.	Ditto ditto ditto.
7	Egyptian ...	Similar characteristics to American cotton but somewhat short stapled.	No remarks ..	Though the staple is short yet the variety yields a fair outturn and further trials may be given to it.
8	Hinganghat ...	This cotton appears to me to be somewhat different from the best Ringanghat cotton being less silky and having a weaker staple. The cotton itself is clean and soft and has a fibre varying from 1 to 1¼" inches. Of course a good spinning cotton.	Ditto ...	This is one of the most famous varieties in our country. Fresh seed will be obtained through Director, Land Records, Central Provinces, and tried next season.
9	S. B. Mexcy ...	The usual characteristics of American cotton, very silky appearance and if anything a finer staple.	Ditto ...	Not worth keeping on. Cultivation should be given up.
10	Shine's Early Prolific.	A very silky soft cotton—fibres beautifully fine and long, but not very strong, staple 1 to 1¼ inches long and fairly regular—a splendid spinning cotton.	Ditto ..	The outturn has always been very poor. However fine this variety may be for spinning purposes, its cultivation would never be a financial success : I therefore propose to discontinue its cultivation.
11	Jone's Improved	A similar but not as good cotton as " Shines early " and fibre on seed apparently less abundant, good color but a little leafy.	Ditto ..	This is admittedly inferior to the last mentioned variety and its cultivation should be given up.

24. Experiment with mixed crops.—This experiment has been under trial for the last three years. The object is to ascertain the comparative outturn of the various crops in the commoner mixtures in which they are generally grown by the native cultivators.

The subjoined table gives the yield of each crop :—

KHARIF STATEMENT No. VII.—*Experiment with mixed crops.*

Serial number.	Crops. Name.	Quantity of seed sown.	Outturn per acre during the year under report. Grain or cleaned cotton.	Outturn per acre during the year under report. Straw or seed of cotton.	Outturn per acre last year (1892-93). Grain or cleaned cotton.	Outturn per acre last year (1892-93). Straw or seed of cotton.	Cost of cultivation including cost of seed, rent, labor, &c., per acre.	Value of outturn, *i.e.*, seed, straw or fibre.	Profit or loss.
		lb.	lb.	lb.	lb.	lb.	Rs. a. p.	Rs a. p.	Rs. a p.
1	Arhar ...	1	1,186	3,596	137	508	16 8 0	39 3 0	...
	Cotton ...	2	1·3	2·6	5	12		0 4 0	...
	Til ...	¼	...	..	...	...		...	...
	Urd ...	¼	31	315	21	298		1 8 0	...
							16 8 0	42 9 0	+26 1 0
2	Bajra ...	2	280	2,439	524	4,667	16 8 0	7 4 0	..
	Arhar ...	1	756	2,302	371	1,100		24 14 0	...
							16 8 0	32 2 0	+15 10 0
3	Juar ...	2	349	3,082	960	8,268	16 8 0	13 10 0	...
	Arhar ...	1	536	2,210	1,424	3,466		20 11 0	...
							16 8 0	34 5 0	+17 13 0
4	Castor ...	1	283	...	837	...	16 8 0	11 11 0	...
	Cotton ...	2	1·6	2	1	2		0 5 6	...
	Til ...	¼	...	...	...	..		...	...
	Urd ...	¼	23	225	7	56		1 3 0	..
							16 8 0	13 3 6	−3 4 6

Price of Arhar seed calculated @ 48 lb. the Rupee, and of Arhar stalks @ 500 lb. the Rupee; of cotton fibre @ 5 lb per Rupee, and of cotton seed @ 60 lb. the Rupee; of Urd seed @ 30 lb. the Rupee, and of Urd stalks @ 250 lb. the Rupee; of Bajra seed @ 40 lb. the Rupee; of Juar seed @ 50 lb the Rupee, and of Juar stalks @ 492 lb the Rupee.

The highest money profit has been obtained from mixture I.

25. Experiment to determine the comparative effect of gypsum and other manures on indigo.—This experiment was taken up during the year under report with the object of ascertaining the comparative effect of gypsum, bone dust and farm-yard manure on indigo crop. Four plots each measuring 1,210 sq. yards have been allotted to the experiment. The plots were watered on the 29th April to soften the soil and manures applied on the 2nd May which were ploughed in the same day. The seed was sown broadcast on the 4th of May at the rate of 12lb. per acre. Two waterings were given, one on the 20th of May and the other on the 17th of June, and the crop was cut on the 9th of August.

The following table gives the outturn of each plot :—

KHARIF STATEMENT No. VIII.—*Experiment to determine the comparative effect of gypsum and other manures on indigo.*

Serial number.	Manure applied per acre.	Cost of manure.	Outturn of green indigo per acre.	Increased or decreased outturn over the unmanured plot.	Value of the outturn.	Net profit or loss.
		Rs. a. p.	lb.	lb.	Rs. a p.	Rs. a. p
1	Cow-dung, 180 maunds ...	5 6 0	12,136	+ 4,756	15 14 0	+10 8 0
2	Gypsum, 3 maunds ...	5 4 0	10,496	+ 3,116	10 6 0	+5 2 0
3	Bone dust, 20 maunds ...	45 13 0	10,660	+ 3,280	10 15 0	−31 14
4	Unmanured	...	7,380	...	...	...

Cow-dung has given better result than either gypsum or bone dust, and the latter has proved anything but economical from a financial point of view.

26. At the request of the Upper India Chamber of Commerce, an interesting experiment was tried with indigo seeds varying from 1 to about 5 years old to determine their comparative vitality and productive power.

The seeds were sown in 5 different plots each measuring 684 square yards. The following is a detail of operations performed in the fields :—

Date.	Operation.
13th April 1893	First watering to soften the earth for ploughing ;
16th „	„ ploughing ;
18th „	Second watering ;
19th „	„ ploughing ;
1st May 1893	Third watering ;
30th „	Fourth watering ;
9th August 1893	Stalks cut down for sale and stumps 6" high left in the soil. These stumps gave off new shoots which produced the seed.
20th to 30th September ...	Weeding.
14th December	Harvesting.

The result of the crop is detailed in the subjoined table :—

KHARIF STATEMENT No. IX.

Serial number.	Detail of seeds.	Outturn per acre. Plant.	Outturn per acre. Seed.	Cost of cultivation, seed, rent, labor, &c.	Value of the plant.	Value of the seed.	Total value of the produce.	Net profit or loss.
		lb.	lb.		Rs. a.	Rs. a.	Rs. a.	Rs. a.
1	Indigo seed from crop harvested in 1892.	8,849	159	Rs. 19 per acre.	29 8	6 6	35 14	16 14
2	Indigo seed 1 year old ...	9,719	173		32 6	6 15	39 5	20 5
3	„ „ 2 years ...	6,963	157		23 3	6 4	29 7	10 7
4	„ „ 3 „ ...	6,963	152		23 3	6 1	29 4	10 4
5	„ „ 4 „ .	5,222	142		17 6	5 10	23 0	4 0

The results of plots 2 to 5 show that the older the seed the poorer is the yield, both of stalks and of the seed, but this does not hold good in the case of plot 1 in which the crop was attacked by the insect *Gudahi* (crotogonus). It is also noteworthy that old seed is not absolutely unfit for sowing purposes as is the belief among the native cultivators.

RABI SEASON EXPERIMENTS.

27. The programme of these experiments was drawn up by me and approved by the Agricultural Chemist, and they were conducted accordingly. Details of modifications made thereby in the old experiments will be found under remarks upon the various experiments.

28. The season was on the whole unfavourable at Cawnpore as it was in many other districts of the N.-W. Provinces.

The wheat crop suffered generally from the untimely and excessive rains in February, and certain plots were besides injured more or less by rust. The hail storm of 6th February 1894 did a certain amount of damage to the crop generally, and the excess of moisture caused by the winter rains resulted in the too luxuriant growth of straw. The grain therefore became thin and small.

29. The most important experiments with wheat are carried on in two series each consisting of 13 plots of 400 square yards each.

One series in which wheat is grown year after year is called the " Standard " and the other in which a crop of maize is taken alternately with wheat is called the " Duplicate." The manure applied to each plot of the one series is also applied to the corresponding plot of the other, and the tillage operations in both the series are similar in all other respects.

30. The following statements show the results of the Standard and the Duplicate Series :—

RABI STATEMENT No. I.—*Standard Series.—Manure experiment with wheat.*

Number of plot.	Manure per acre.	Outturn per acre.				Increased or decreased outturn per acre as compared with the unmanured plot			
		Grain.		Straw.		Grain.		Straw.	
		Average of last five years	Year under report	Average of last five years.	Year under report.	Average of last five years.	Year under report	Average of last five years.	Year under report
		lb.	lb	lb.	lb.	lb	lb.	lb	lb.
4	Cow dung, 180 maunds + bone dust, 4½ maunds.	1,706	1,700	3,165	3,309	+525	+554	+738	+1,128
5	Cow dungs, 180 maunds + gypsum, 3 maund	1,620	1,639	3,070	3,122	+439	+493	+643	+941
3	Cow-dung, 180 maunds ...	1,581	1,688	3,014	3 333	+400	+542	+587	+1,152
7	Ashes of 180 maunds of cow-dung,	1,329	1,452	2,413	2,604	+148	+306	−14	+428
1	Saltpetre, 3 maunds	1,416	1,630	2,776	3,327	+235	+484	+349	+1,146
9	Saltpetre, 3 maunds + bone superphosphate, 3 maunds	1,578	1,869	2,808	3,252	+397	+723	+381	+1,071
8	Sheep-dung, 180 maunds + bone dust, 4½ maunds.	1,584	2,063	2,937	3,990	+403	+917	+510	+1,809
13	Ashes of 180 maunds of cow-dung + saltpetre, 3 maunds.	1,442	2,048	2,638	3,763	+261	+902	+211	+1,582
12	Poudrette, 180 maunds ...	1,699	1,528	3,611	4,764	+518	+382	+1,184	+2,583
6	Sheep dung, 180 maunds	1,610	2,015	3,423	3,778	+429	+869	+996	+597
2	Saltpetre, 3 maunds + bone dust, 4½ maunds	1,480	1,652	2,666	2,886	+299	+506	+239	+705
10	Sheep-dung, 180 maunds + gypsum, 3 maunds.	1,748	1,936	3,009	3,709	+567	+790	+582	+1,528
11	Unmanured	1,181	1,146	2,427	2,181	...		..	.

RABI STATEMENT No. II.—*Duplicate Series.—Manure experiment with wheat.*

Number of plot.	Manure applied per acre.	Outturn per acre.				Increased or decreased outturn per acre as compared with the unmanured plot.			
		Grain.		Straw.		Grain.		Straw.	
		Average of last five years.	Year under report.	Average of last five years.	Year under report.	Average of last five years.	Year under report.	Average of last five years.	Year under report.
		lb.	lb	lb.	lb.	lb	lb.	lb.	lb.
7	Cow-dung, 180 maunds + bone dust, 4½ maunds.	1,592	1,262	3,182	2,539	+232	+157	+707	+385
8	Cow-dung, 180 maunds + gypsum, 3 maunds	1,528	1,712	2,978	3,433	+168	+605	+503	+1,279
6	Cow dung, 180 maunds	1,799	1,482	3,345	2,946	+439	+375	+870	+792
9	Ashes of 180 maunds of cow-dung	1,406	1,434	2,638	2,257	+46	+327	+163	+103
4	Saltpetre, 3 maunds	1,423	1,736	2,681	3,016	+63	+629	+206	+862
11	Saltpetre 3 maunds + bone superphosphate, 3 maunds.	1,565	1,936	2,305	3,461	+205	+829	−170	+1,307
10	Sheep-dung, 180 maunds + bone dust, 4½ maunds.	2,682	2,033	3,356	3,545	+1,322	+926	+881	+1,391
3	Ashes of 180 maunds of cow-dung + saltpetre, 3 maunds.	1,564	2,184	2,819	2,756	+204	+1,077	+421	+602
2	Poudrette, 180 maunds ...	1,868	1,875	3,944	4,253	+508	+768	+1,469	+2,099
1	Sheep-dung, 180 maunds .	1,602	1,730	2,636	3,784	+242	+623	+361	+1,630
5	Saltpetre 3 maunds + bone dust, 4½ maunds	1,626	1,742	3,034	3,566	+266	+635	+559	+1,412
12	Sheep-dung, 180 maunds + gypsum, 3 maunds.	1,924	1,966	3,579	4,283	+564	+859	+1,104	+2,129
13	Unmanured	1,660	1,107	2,475	2,154	...	...	...	...

31. The operations carried on in these plots were similar to those reported in full detail last year, and the only alteration in the treatment consisted in the application of Saltpetre to plots (1), (2) and (9) of the Standard, and (4), (5) and (11) of the Duplicate Series as a topdressing when the plants were fairly up, instead of that manure being ploughed in, as in former years, previous to sowing.

32. The results of this year only confirm the fact established by the trials made during the 12 preceding years that nitrogenous manures are the best for wheat. Sheep-dung and a mixture of sheep-dung with bone dust or gypsum have given very good results in both series. There is not the slightest doubt as to the value of this particular class of dung as a fertiliser and it appears to contain a higher percentage of nitrogen than the dung of other animals—a fact which has yet to be determined by a series of chemical analyses. Ashes of cow-dung with saltpetre have given the highest yield this year in the two series. The mixture ranks first among the Duplicate plots, and 2nd among the Standard, and similar results have been obtained by an application of the mixture elsewhere at the Farm, tending to show that the loss of nitrogen caused by the burning of the dung is amply recompensated by the addition of saltpetre to the ash.

33. The application of saltpetre as a top dressing has proved more beneficial, as the yield of each plot to which it was applied as a top dressing has been considerably higher than the average of the past five years in which it used to be ploughed in. This fact substantiates the theory that nitre being a quickly decomposible manure should be applied best at the time when the crop is sufficiently advanced to fully utilize its main fertilising agent, the nitrogen.

34. Saltpetre mixed with superphosphate has given a higher outturn than Saltpetre alone, a fact consistent with the principles of science. Cow-dung alone has given poorer results this year than it did in most of the previous years, in the Duplicate series indeed it has been surpassed by saltpetre applied alone. The old manure pits at the Farm were flooded by water from an adjoining tank owing to its overflow in the rains and most of the manurial ingredients were consequently washed into the tank. The value of the manure left in the pit was highly doubtful and it was preferred therefore to apply dung collected in another pit at the Farm during the rainy season. As this dung was comparatively fresh, probably it could not fully decompose during the period of active growth of the wheat, and the whole of nitrogen was not therefore assimilated by plants. This would explain the low yield of the cow-dung plots. The experiment suggests the conclusion that cow-dung does not produce its best effects unless applied to wheat in a thoroughly rotten state.

35. The following statement shows the financial results of these experiments :—

RABI STATEMENT II (A).—SHEWING THE FINANCIAL RESULTS.

Manure applied per acre.	Cost of manure per acre.	Standard Series.					Duplicate Series.				
		Cost of cultivation (including rent, seed, labor, &c.) per acre.	Total cost.	Value of produce per acre in 1893-94, at 32 and 246 lbs the rupee of grain and straw, respectively.	Net profit or loss.	Order according to profit.	Cost of cultivation (including rent, seed, labor, &c.) per acre.	Total cost.	Value of produce per acre in 1893-94, at 32 and 246 lbs the Rupee of grain and straw, respectively.	Net profit or loss.	Order according to profit.
	Rs. a. p.	Rupees 27 per acre.	Rs. a. p.	Rs. a. p.	Rs. a. p.		Rupees 27 per acre.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Cow-dung, 180 maunds + bone dust 4½ maunds.	16 1 0		43 1 0	66 9 0	+ 23 8 0	IX		43 1 0	19 13 0	6 12 0	XIII
Cow-dung, 180 maunds + gypsum, 3 maunds.	10 10 0		37 10 0	63 15 0	+ 26 5 0	VIII		37 10 0	67 7 0	29 13 0	VII
Cow-dung, 180 maunds ...	5 6 0		32 6 0	66 5 0	+ 33 15 0	V		32 6 0	48 4 0	15 14 0	XII
Ashes of 180 maunds of cow-dung.	5 6 0		32 6 0	55 7 0	+ 23 1 0	X		32 6 0	54 0 0	21 10 0	IX
Saltpetre, 3 maunds ...	9 0 0		36 0 0	64 7 0	+ 28 7 0	VII		36 0 0	66 12 0	30 12 0	VI
Saltpetre, 3 maunds + bone-superphosphate, 3 maunds.	30 0 0		57 0 0	71 11 0	+ 14 11 0	XIII		57 0 0	75 1 0	18 1 0	X
Sheep-dung, 180 maunds + bone dust 4½ maunds.	16 1 0		43 1 0	80 12 0	+ 37 11 0	III		43 1 0	77 9 0	34 8 0	V
Ashes of 180 maunds of cow-dung + saltpetre, 3 maunds.	14 6 0		41 6 0	78 8 0	+ 37 2 0	IV		41 6 0	79 7 0	38 1 0	III
Poudrette, 180 maunds ...	7 3 0		34 3 0	63 0 0	+ 28 13 0	VI		34 3 0	75 13 0	41 10 0	I
Sheep-dung, 180 maunds ...	5 6 0		32 6 0	78 5 0	+ 45 15 0	I		32 6 0	69 7 0	37 1 0	IV
Saltpetre, 3 maunds + bone dust, 4½ maunds.	19 11 0		46 11 0	63 6 0	+ 16 11 0	XII		46 11 0	69 15 0	23 4 0	VIII
Sheep dung, 180 maunds + gypsum 3 maunds.	10 10 0		37 10 0	75 9 0	+ 37 15 0	II		37 10 0	78 14 0	41 4 0	II
Unmanured ...	...		27 0 0	44 11 0	+ 17 11 0	XI		27 0 0	43 5 0	16 5 0	XI

The most economical results have been obtained from (*a*) sheep-dung applied singly or with artificial manures, (*b*) poudrette, and (*c*) mixture of saltpetre with ashes which mixture seems to be the best available inorganic manure suitable for wheat.

36. The following statement shows the ratio between grain and straw in the two series taking grain as a unit :—

RABI STATEMENT II (B).

Serial number.	Manure applied.	Ratio between grain and straw during 1893 94	
		Standard Series.	Duplicate Series.
1	Saltpetre, 3 maunds	1 : 2·04	1 : 1·74
2	Saltpetre, 3 maunds + bone dust, 4½ maunds	1 : 1·75	1 : 2·05
3	Cow dung, 180 maunds	1 : 1·97	1 : 1·99
4	Cow-dung, 180 maunds + bone dust, 4½ maunds	1 : 1 95	1 : 2·01
5	Cow-dung 180 maunds + gypsum, 3 maunds	1 : 1 90	1 : 2·00
6	Sheep-dung, 180 maunds	1 : 1 87	1 : 2·19
7	Ashes of 180 maunds of cow-dung	1 : 1·79	1 : 1·57
8	Sheep-dung, 180 maunds + bone dust, 4½ maunds	1 : 1 93	1 : 1·74
9	Saltpetre, 3 maunds + bone superphosphate, 3 maunds	1 : 1 74	1 : 1·79
10	Sheep-dung, 180 maunds + gypsum, 3 maunds	1 : 1·90	1 : 2·18
11	Unmanured	1 : 1·90	1 : 1·95
12	Poudrette, 180 maunds	1 : 3·12	1 : 2·27
13	Ashes of 180 maunds of cow-dung + saltpetre, 3 maunds	1 : 1·84	1 : 1·26

The highst percentage of straw was yielded by the poudrette plot in both the series. In the Standard it was unusually high showing that on account of the exceedingly stimulating nature of the manure, aided by the effects of winter rains, it promoted the growth of stalk at the expense of grain.

Green manuring Series.

37. This experiment was started in 1884, and there are 13 plots under it, each 400 square yards in area.

The object of the experiment is really a double one. On the one hand either a green crop or an organic vegetable manure is ploughed in to act directly upon wheat.

On the other it is determined whether the root residue of a leguminous crop benefits the succeeding cereal crop. The experiment has been admitted to be a valuable one by the Agricultural Chemist who has, however, modified the treatment of certain plots of this series.

The alterations are as follows :—

No. of plot.	Treatment up to 1892-93.	Treatment proposed by the Agricultural Chemist to the Government of India.	Treatment adopted during the year.
3	Indigo water, 3,600 cubic feet	Rape (*Sehwán*) to be ploughed in.	Wheat grown. (*Sehwán* will be grown next August).
4	Hemp water, 3,600 cubic feet...	Gram and wheat alternately...	Gram sown.
6	Wheat sown after hemp crop had been cut.	Hemp and wheat alternately...	Wheat sown.
10	Green indigo ploughed in, and gypsum, 6 maunds.	Urd and wheat alternately ...	Wheat sown.
11	Green hemp ploughed in, and gypsum, 6 maunds.	Arhar and wheat alternately	Wheat sown.

The tillage and other operations carried on in the other plots were identical with those reported last year.

38. The following statement shows the outturn, &c., of the plots of this series :—

RABI STATEMENT No. III.—*Shewing results of experiments to determine the effect of green manuring on wheat.*

Serial number.	Manure applied per acre.	Outturn per acre.				Increased or decreased outturn per acre as compared with the unmanured plot.			
		Grain.		Straw.		Grain.		Straw.	
		Average for the last five years.	Year under report.	Average for the last five years.	Year under report.	Average for the last five years.	Year under report.	Average for the last five years.	Year under report.
		lb.	lb.	lb.	lb.	lb.	lb.	lb	lb.
1	Old indigo refuse, 120 maunds ploughed in.	1,644	1,543	3,573	4,187	+550	+666	+1,647	+2,457
2	Fresh indigo refuse, 120 maunds ploughed in.	1,624	1,349	3,427	5,838	+530	+472	+1,501	+4,108
3	Rape to be ploughed in, wheat this year.	953	756	2,011	1,957	−141	−121	+85	+227
4	Gram and wheat alternately, gram this year.	...	1,113	...	1,222	...	..	...	...
5	Unmanured	1,094	877	1,926	1,730	...	...	...	...
6	Hemp and wheat alternately.	1,087	1,031	1,914	2,139	−7	+154	−12	+409
7	Green hemp ploughed in ...	1,302	935	2,421	1,794	+208	+58	+495	+64
8	Green indigo ploughed in...	1,442	750	2,573	1,957	+348	−127	+647	+227
9	Indigo and wheat alternately.	1,202	696	2,350	1,576	+108	−181	+424	−154
10	Urd and wheat alternately, Urd will be sown next kharif.	1,312	935	2,460	1,878	+218	+58	+534	+148
11	Arhar and wheat alternately.	1,167	1,028	2,272	2,154	+73	+151	+346	+424
*12	Lucerne and wheat alternately, wheat this year.	869	1,168	1,867	2,955	−225	+291	−59	+1,225
*13	Lucerne and wheat alternately, lucerne this year.	946	Lucerne standing.	1,878	Lucerne standing.	−148	...	−48	...

Note.—The cost of cultivation may be taken @ Rs. 27 per acre, including rent, seed, labour, &c., but exclusive of manure. For calculating value of produce the following rates have been taken :—

(*a*) Grain @ 32 lbs the Re.

(*b*) Straw @ 246 lbs ,, Re.

The value of the outturn of the unmanured plot is thus estimated @ Rs. 34-7 per acre, giving a net profit of Rs. 7-7. For the previous 5 years the average net profit on the plot was Rs. 15-1. The net profit this year of Nos. 1, 2, and 12 was Rs. 38 4, Rs. 38-15 and Rs. 21-8, and the average of profit for the previous five years was Rs. 38-14, Rs. 37-11 and Rs. 7-12, respectively.

* The crops on these two plots are so arranged that when one plot bears wheat the other bears lucerne.

The best results were obtained from plots Nos. 1 and 2. The value of indigo refuse as a vegetable manure for wheat established by the results obtained during the past years is confirmed by the results of this year. The next best results have been obtained from the plot on which wheat alternated with lucerne, whose root residue seems to produce fertilising effects similar to those of clover in European countries.

Hemp stumps ploughed in also acted beneficially, though not to the same extent as the lucerne roots.

Green indigo ploughed in and wheat taken after indigo (plot 9) gave poor results this year owing to the indigo crop having been seriously damaged by the insect *Gadahi* (crotogonus).

Plot No. 12 was treated until 1891, as an unmanured plot, growing wheat year after year. In 1892 it was sown with lucerne. In 1893-94 a crop of wheat was taken for the first time after lucerne. The averages given with reference to this plot, therefore, really denote the yield of an unmanured plot. This accounts for the increased outturn during the year under report.

39. An experiment to ascertain the manurial effect of the ploughing in of certain other green leguminous crops was tried on a plot of ground elsewhere at the Farm. This plot was comparatively inferior naturally in point of fertility. The green crops

were sown on 4th June 1893, and ploughed in on 3rd August 1893. Wheat was sown on 2nd November 1893, and watered twice. The results are shewn in the subjoined table :—

A.

STATEMENT SHEWING THE OUTTURN OF FIELD No. 27.—*Rabi Experiment*, 1893-94.

No. of plot.	Treatment.	Outturn per acre.		Increased or decreased outturn as compared with the unmanured plot.	
		Grain.	Straw.	Grain.	Straw.
		lbs.	lbs.	lbs.	lbs.
1	Green hemp ploughed in ...	837	2,147	+296	+638
2	Green khurti ploughed in ...	858	1,943	+317	+434
3	Green Urd ploughed in ...	720	1,556	+179	+47
4	Unmanured	541	1,509	...	...

It is clear that all these crops benefit the succeeding wheat crop. Khurti (*cyamopsis psoraloides*) appears to be a plant which might be sown with some advantage for the purposes of green manuring. It gives slightly better results than hemp.

40. Ploughing Series.—The object of this experiment is to determine the effect of deep and shallow ploughing on the growth of wheat without the application of a manure. There are 3 plots under this experiment, each 2,450 square yards in area.

Nos. 1 and 2 are ploughed 4 times, 9″ and 5″ deep, respectively, with an improved plough (the Cawnpore Watt's) and the 3rd ploughed 8 times 3″ deep with the ordinary native plough. In other respects the treatment of all the 3 plots is alike. The following statement shows the results of the experiment:—

RABI STATEMENT No. IV.—*Ploughing experiment with wheat.*

Serial number.	Treatment.	Cost of ploughing per acre.	Outturn per acre.				Increased or decreased outturn over the plot ploughed with country plough.			
			Grain.		Straw.		Grain.		Straw.	
			Average of the last five years.	Year under report.	Average of the last five years	Year under report.	Average of the last five years.	Year under report.	Average of the last five years.	Year under report.
		Rs.	lb.	lb.	lb	lb.	lb.	lb.	lb.	lb.
1	Ploughed 9″ deep 4 times with Improved plough.	3	1,172	1,078	2,492	2,388	+26	+75	−47	−96
2	Ploughed 5″ deep 4 times with Improved plough.	3	1,300	1,073	2,636	2,221	+154	+70	+97	−263
3	Ploughed 3″ deep 8 times with country plough.	6	1,146	1,003	2,539	2,484	...	...	...	...

NOTE. The cost of cultivation may be taken @ Rs. 21 per acre, including rent, seed and labor, but exclusive of ploughing. The value of produce, at a reasonable estimate, may be put at Re 1 per 32 lb. of grain and Re. 1 per 246 lb. of straw. According to this estimate the outturn of the first plot was worth Rs. 43-6, of the second plot worth Rs 42-8, and of the third plot worth Rs. 41-8. Deducting from these the cost of cultivation (*viz.*, Rs 21) *plus* cost of ploughing noted opposite each plot, the profit was Rs 19-6, Rs 18-8, and Rs. 13-8, respectively, showing that deep ploughing with improved plough is more profitable than ploughing with the native plough.

41. The yield in each case was inferior as compared with the average of the past five years owing to the unfavorable character of the season. There was no remarkable difference between the outturns of plots 1 and 2, but the results yet go to prove that deep ploughing with an improved plough is decidedly more economical, as shown in previous years, than shallow ploughing with a native plough.

42. Remarks on the quality of the grain.—With regard to quality, the produce of the Standard Series, was generally speaking, the best. The Duplicate Series came next in this respect. The most plump, white and uniform grains were found in

the produce of the plot treated with saltpetre in both the series. Plots treated with sheep-dung and cow-dung mixed with bone dust produced fine plump grains, but not equally good in color. The grain from the saltpetre and superphosphate plot was superior in quality to that of the cow-dung plot in the standard series.

43. In the green manuring series the produce of plots 11 and 7 was superior in respect of quality to that of the rest, but inferior in every respect to the best samples of the Standard and the Duplicate Series.

44. In the ploughing series the plot ploughed 9″ deep produced the best quality of grain in the lot, but inferior to the best samples of green manuring series.

45. Experiment with Gram.—This experiment was taken up this year with the object of determining the relative manurial effect of (*a*) sulphate of lime (gypsum) upon the leguminous crops, and (*b*) ground *kankar*, which consists chiefly of carbonate of lime in comparison with Farm-yard manure and bone superphospate. The *kankar* was fairly powdered at the Farm with a *dhekli* and used for the first time as a manure, and the aim was to find out whether lime would benefit a leguminous crop if applied in the form of carbonate (which is cheaper) as well as in the form of sulphate. The operation consisted of :—

(1) Ploughing, 3 times with the Watt's plough.

(2) Ditto twice with the country plough.

(3) Levelling with the *patela*.

(4) Sowing at the rate of 80 lbs. per acre.

The following table gives the outturn of each plot :—

RABI STATEMENT NO V.—*Shewing the effect of certain manures on gram in* 1893-94.

No. of plot.	Manure applied per acre.	Outturn per acre		Increased or decreased outturn as compared with the unmanured plot.	
		Grain.	Straw.	Grain	Straw.
		lb.	lb.	lb.	lb.
1	Farm-yard manure, 100 maunds ...	1,543	1,089	+687	+156
2	Gypsum, 3 maunds	1,730	1,470	+874	+534
3	Ground Kankar, 2½ mds.	1,183	1,031	+327	+95
4	Bone superphosphate, 3 mds.	1,128	929	+272	—6
5	Unmanured	856	935	...	

46. The value of gypsum as a special manure for leguminous crops has been recognized in England after years of experimentation, and the results obtained in this experiment show that it is capable of producing equally good effect in this country under favorable circumstances. The *kankar* plot, though it gave smaller yield than plots 1 and 2, has outstripped the superphosphate plot—shewing that lime is more beneficial to gram if applied in the form of carbonate in which it is very commonly found in nature. The profit or loss on each manured plot was as under :—

	Rs.	a.	p.
(1)	+11	12	0
(2)	+14	14	0
(3)	+ 5	5	0
(4)	—15	6	0

This shows that gypsum is most economical.

The rate at which value of outturn has been calculated in the above experiment is given below :—

Gram 48lbs. the Re.
Straw 328lbs. the Re.

EXPERIMENTS WITH FOREIGN GRAINS.

47. Experiments relating to acclimatisation of foreign varieties of wheat and barley have been discontinued at my suggestion, and with the Agricultural Chemist's

approval, but the experimental cultivation of Canadian oats carried on during the past 3 years has been allowed to continue with a view to obtaining some definite result. The outturn of the different varieties of oats is given in the subjoined statement :—

RABI STATEMENT No. VI.—*Shewing outturn of Canadian oats.*

Variety of oat.	Average outturn per acre, of the last 3 years.		Outturn per acre in 1893-94.	
	Grain.	Straw.	Grain.	Straw.
	lb.	lb.	lb.	lb.
(1) Prize Chester	368	4,503	178	5,456
(2) Canadian Triumph	449	4,216	160	5,536
(3) Rennie's Prize	323	3,880	544	13,680
(4) Welcome	461	4,284	200	5,920
(5) Bonanza	439	4,681	336	13,960
(6) White Egyptian	467	3,561	192	5,368

Date of sowing of each plot, 27th October 1893.

48. The outturn of grain is as usual very poor as compared with the yield of Cape oats which produced 14 maunds or 1,148lb. per acre, on an average, at the experimental station during the year. An attempt was made in the earlier stages of the growth of the Canadian oat crop to check the too luxuriant development of straw by nibbling the tops with a sickle to the extent of about 6 inches and thus to give the crop a chance of yielding greater outturn in grain, but this was unsuccessful. The straw grew inordinately in spite of the preventive treatment—the plants giving off larger number of shoots most of which did not bear ears. Canadian oats appear therefore to be excellent for raising heavy crops of nutritious green fodder.

49. Manurial experiment with country potatoes.—This was started during the year with the approval of the Agricultural Chemist on five plots with the object of determining the effect of certain nitrogenous manures as compared with that of the Farm-yard manure on the Farrukhabad potato, which is a most favourite variety with the natives. The following is a detail of the operations carried on :—

STATEMENT A.—*Details of potato cultivation.*

Date.	*Operations.*
28th July to 9th October 1893 ...	... { Four ploughings with Watt's plough. Four ploughings (succeeding) with country plough.
10th October 1893	... Manuring.
11th „	... Ploughing in the manure.
13th and 14th October 1893 ...	... Ridging. This ridging was damaged by rain, hence,
23rd October 1893	... Plouging again.
26th, 27th and 28th October 1893 ...	... Ridging again.
30th November 1893	... Tubers planted on ridges 2 feet apart @ the rate of 10 maunds per acre.
14th „	... Plot No. 4 topdressed with saltpetre.
15th „	... 1st Watering.
22nd to 25th November 1893 ...	... Earthing up.
6th December 1893	... 2nd Watering.
17th to 18th December 1893 ...	... Earthing up.
23rd December 1893	... 3rd Watering.
4th to 8th January 1894	... Earthing up.
15th January 1894	... 4th Watering.
29th „	... 5th Watering,
28th February 1894	... Harvesting.

The sowing was delayed a fortnight, owing to late arrival of the consignment of the seed from Farrukhabad. The statement below shows the yield of the various plots :—

RABI STATEMENT No. VII.—*Manure experiment with country potato.*

Serial No.	Manure applied per acre.	Cost of manure per acre.	Outturn (tubers) per acre.	Increase or decrease in outturn over the unmanured plot.
		Rs.	lb.	lb.
1	Farm-yard manure, 200 maunds	6	10,170	+2,977
2	Poudrette, 200 maunds	8	5,953	—1,240
3	Castor oil cake, 12 maunds	12·12	11,410	+4,217
4	Bone superphosphate, 4 maunds + saltpetre, 4 maunds	40	11,906	+4,713
5	Unmanured	...	7,193	...

Note.—Taking the cost of cultivation, exclusive of manure at Rs. 64 per acre, and the average rate at which potato was sold at Re. 1 per 100 lbs., the financial result of the experiment is as follows :—

	Rs.	a.	p.
(1) Profit	31	11	0
(2) Loss	12	8	0
(3) Profit	37	5	0
(4) „	15	0	0
(5) „	8	0	0

50. The highest yield was obtained from plot 4. Plot 3 stood next with reference to outturn. It is a popular belief that castor oil cake is a beneficial manure for potatoes. In this experiment the manure has produced the best financial result. The tubers in this plot were far more numerous, though much smaller in size, than the tubers of other plots.

The yield of plot 1, though less in quantity than that of plots 3 and 4, was yet superior to all the rest in quality, the potato varying from 2¼ to 2½″ in diameter, and weighing about 6 oz. on an average. This is explained by the fact that Farm-yard manure being more bulky than other manures, renders the soil more loose, and the tubers find greater scope for development.

In the poudrette plot the growth of plants was too luxuriant owing to the highly stimulating effects of the manure, and they were so seriously knocked down by the rain accompanied with the storm on 7th of February, that the yield suffered considerably and was less than that of the unmanured plot. The potatoes of the unmanured plots were mostly small but uniform in size; the largest weighed about 4 ounces.

According to the English taste, the best potatoes for table use were those produced from the Farm-yard manure plot.

51. Similar experiment was tried with hill potatoes on five plots. The seed was obtained in October from Naini Tal through a contractor. The results will appear from the following table :—

RABI STATEMENT No. VIII.—*Experiment with hill potato.*

Serial No.	Manure applied per acre.	Cost of manure per acre.	Outturn (tubers) per acre.	Increase or decrease in outturn over the unmanured plot.
		Rs.	lb.	lb.
1	Farm-yard manure, 200 maunds	6	1,664	+583
2	Poudrette, 200 maunds	8	2,532	+1,451
3	Castor oil cake, 12 maunds	12·12	2,656	+1,575
4	Bone superphosphate, 4 maunds + Saltpetre, 4 maunds	40	2,881	+1,800
5	Unmanured	...	1,081	...

The crop was almost a complete failure owing to very scanty germination and the experiment will be repeated next year.

MISCELLANEOUS.

52. Fodder crops:—Some experiments were tried with fodder crops during the year under report, of which the most important and interesting was the one relating to cultivation of Egyptian or *Barsim* clover (*Trifolium Alexandrinum*) the seed of which was obtained from Egypt. It arrived at Cawnpore about the middle of November 1893, and was sown first on the 21st November. The following are briefly the probable conclusions that can be drawn from the results obtained by the experiments tried on different plots:—

1. That the clover can be grown successfully in this part of the country;

2. That light loam is the most suitable soil for the crop, and that in a stiff clay soil the crop is almost a failure;

3. That early sowing in winter is essential for its successful growth;

4. That manure is not essentially necessary, and that probably heavy manuring does more harm than good to the crop;

5. That weeding and irrigation in the earlier stages of growth are beneficial.

The necessity for producing as much seed as possible prevented the determination this year of the number of cuttings that can be taken during the growing period, and of the total yield per acre of the green food. These points will be attended to next year. Green clover is eaten with relish by the cattle and horses, and so is the clover hay, and neither seems to produce costiveness or flatulence. As the experiment is quite new, I subjoin a statement giving full details of the treatment and yield of the several plots in which it was tried.

MISCELLANEOUS STATEMENT No. I.—*Shewing experiments with clover (Rabi, 1893-94.)*

Serial number.	No. of Field as per farm map.	Area in square yards.	Class of soil.	Treatment.	No. of ploughings	Seed sown per acre.	Method of sowing	Date of sowing	Date of mowing	No. of weedings.	No. of waterings.	Average height of plant.	Actual outturn per plot. Sheaves	Grain.	Straw.	Outturn per acre. Grain.	Straw.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
						lbs.						Ft.	lbs	lbs.	lbs.	lbs	lbs.	
1	27 (Corner)	363	Light loam.	No manure.	2	6	Sown in the furrow oped by a country plough.	21-11-93..	3-5 94 ...	3	5	3 ft.	53	2½	50½	28	678	This plot which had been lying fallow during the rains was artificially irrigated before sowing and ploughed twice. The seed was then sown behind the country plough and buried about 3 inches deep Germination did not take place until after 15 days after sowing. A light watering had to be given before germination, and the crust found at the surface softened by *khurpa*. The seed did not germinate where it was buried too deep in the ground. The crop was irrigated 5 times from December 1893 to March 1894.. It began to flower early in February 1894, and the growth of stems continued till the end of March. When fully grown, the average height of the plants was about 3 feet. The flowers were white in color. The seed began to form about the end of March and was of yellow brown color in the end of April when fully ripe. Before formation of seed, two kinds of bees were frequently seen hovering about the flowers and these were probably the fertilising agents. This plot gave the highest outturn of seed showing that early sowing in winter and light soil are apparently essential for successful cultivation of the crop in this part of the country.
2	24	846	Heavy loam	Ditto	5	6	Broadcast	5-12 93 .	3-5-94 ..	3	4	2½ ft.	61	7/16	60 9/16	2¼	346	These two plots which had yielded kharif crops before, were first irrigated and then ploughed 5 and 7 times owing to stiff nature of the soil. The seed was sown broadcast and covered over with earth The germination was even and uniform The plants did not grow so high as in case of plot Serial No. 1—and the number of flowers was considerably less, the sowing of seed having been done a fortnight later. The land had received no manuring during the past 3 years
3	17	496	Light loam but containing somewhat high percentage of clay.	Do.	7	6	Do.	5-12-93 ..	2-5-94 ...	1	5	2½ ft.	68	¼	67½	8½	653	
4	A D. plot 1	1651	Heavy loam.	Do.	6	6	Do.	7-12 93 ..	2-5-94 ..	1	5	2½ ft.	106	2½	103½	8½	302	Plot No. 3, whose soil was lighter than that of plot 2, gave a comparatively higher outturn of seed and straw. The treatment of this plot was similar in all respects to that of plot 3. The yield of grain was about the same in both, but that of straw from plot IV was much inferior.
5	21	946	Stiff clayey	Liquid manure.	2	6	Do.	27-12-93 .	2nd & 3rd May 1894.	1	3	3½ ft.	123	1	122	5	604	The soil of this plot was exceedingly rich from a manurial point of view. The growth of plants was therefore very luxuriant in the beginning and the crop "lodged" before flowering. The seed was sown very late, purposely in order to compare results. The yield of seed was very poor, but that of straw was fairly high.

53. Another experiment has been started during the year to determine the relative economy of sowing lucerne by 3 different methods shown in the subjoined table :—

MISCELLANEOUS STATEMENT No. II—*Shewing effect of different methods of sowing on Lucerne.*

Serial number.	Field.	Method of sowing	Outturn per acre.		
			Yield on first cutting	Yield on second cutting	Total.
1	C *	1. Sown broadcast	121	254	375
2	B *	2. Sown in furrows	363	408	771
	A *	3. Sown on ridges	1,186	517	1,703
4	Green Manuring plot 13 ...	4. Ditto	2,154	1,512	3,666

* A. B. C. are names arbitrarily given to certain plots for facility of reference.

All the plots were sown on 2nd November. The seed in the first three plots either failed to germinate or germinated so scantily that they had to be sown again on 12th January 1894. The largest quantity of green fodder was yielded by the two plots in which the crop was sown on ridges, but the result has to be watched in the succeeding years in order to arrive at some definite conclusion.

54. Among other fodder crops grown were Sorghum Saccharatum, Reana luxurians, Mangel wurzel, and Guinea grass. The produce of each was utilized for feeding the Farm cattle and the brood mares bought last year and broken in the plough.

55. Ensilage.—Chopped fodder, if properly preserved in pits, provides excellent food for cattle in winter when green forage is naturally scarce. During the year under report fodder was siloed in two pits. A detail of operations and results is given below :—

Pit No. (1). *Square; capacity,* 216 *cubic feet.*—The pit was first allowed to get perfectly dry in the sun. On 27th June 1893, maize plants of which cobs had been removed, were first laid at the bottom till a layer of about 1 foot was formed and a similar layer about 6 inches thick was made round the four walls inside the pit. Eighty maunds of green maize stalks were then cut with a chaff-cutter, filled in by instalments in the silo in course of 2 days, and well trodden down by labourers. A layer of maize stalks, 1 foot thick, was then spread over the compressed fodder, and the pit covered over with earth. The surface was then thoroughly rammed and slopes made in order to prevent possibility of damage by rain water. As the surface sank owing to shrinkage of fodder more earth was put up and rammed.

The pit was opened on 1st January 1894. The topmost layer of about 1 foot depth, was found unsuitable for use as cattle food owing to bad smell, but the silage below this layer was perfectly good, and was eaten by cattle with much relish. The total weight of edible fodder obtained was, however, only 21 maunds. The loss of carbonaceous matter due to fermentation was apparently considerable.

Pit No. (2). *Capacity,* 480 *cubic feet.*—This was filled similarly in September with 104 maunds of chopped dry maize stalks, but as rain fell while the silo was being filled, the experiment proved unsuccessful; the pit when opened in March 1894 having been found to contain highly fermented and totally decomposed fodder quite unfit for consumption.

56. The two tables given below show the effect of continuous cropping on unmanured land :—

(*a*) with one and the same crop;

(*b*) with two crops (wheat and maize) taken in rotation.

MISCELLANEOUS STATEMENT No. III.—*Shewing effect of continuous cropping with one and the same crop.*

Year.	Outturn per acre of unmanured plot cropped with wheat year after year.		Outturn per acre of unmanured plot cropped with maize year after year.		Outturn per acre of unmanured plot of A, B, series, cropped every year with cotton.
	Rabi Standard Series.	Green manuring series.	Kharif Standard Series.	Kharif miscellaneous or natural manure series.	
	lb.	lb.	lb.	lb.	lb.
1881-82 ...	777	...	1,239	...	...
1882-83 ...	1,065	...	1,002	...	...
1883-84 ...	1,031	1,515	990	...	...
1884-85 ...	635	628	1,044	684	...
1885-86 ...	913	1,367	339	581	...
1886-87 ...	1,041	847	435	1,222	...
1887-88 ...	968	786	Crop destroyed.	145	...
1888-89 ...	883	653	Do.	Crop destroyed.	145
1889-90 ...	1,307	1,464	278	968	61
1890-91 ...	1,222	1,162	871	109	94
1891-92 ...	992	690	2,009	726	129
1892-93 ...	1,500	1,500	218	487	44
1893-94 ...	1,146	877	1,646	399	134

N.B.—Wheat is sown in October and harvested in April, and the land lies fallow till the next October.
Maize „ June „ September „ „ „ „ June.
Cotton „ „ „ „ „ „ „ „ „

MISCELLANEOUS STATEMENT No. IV.—*Shewing effect of continuous cropping with two crops raised alternately.*

Year.	Outturn per acre of unmanured plot cropped with wheat and maize alternately.				Remarks.
	Duplicate Series A.		Duplicate Series B.		
	Wheat.	Maize.	Wheat.	Maize.	
	lb.	lb.	lb.	lb.	
1881-82	771	...	...	...	In these two plots wheat follows maize after an interval of about 13 months, and maize follows wheat after an interval of about three months.
1882-83	...	924	999	...	
1883-84	2,281	...	...	802	
1884-85	...	564	1,025	...	
1885-86	1,119	...	...	194	
1886-87	...	205	1,258	...	
1887-88	907	...	...	Crop destroyed.	
1888-89	...	Crop destroyed.	617	...	
1889-90	1,876	...	...	302	
1890-91		811	1,597	...	
1891-92	984	...	...	629	
1892-93	...	327	1,754	...	
1893-94	1,107	...	...	786	

The variations in the successive yields of the various plots were due to the effects of the season, but the outturn in the recent years has been sufficiently high in most cases to show that no exhaustion in the soil has taken place on account of the continuous cropping.

The yield of maize in the 2 unmanured plots of the Duplicate Series in which the crop is sown only after the land has had about 3 months rest is generally inferior to the yield of maize from the unmanured plot of the Standard Series which gets a rest of about eight months between two crops. This result is fully consistent with reason.

CAWNPORE;
The 13th June 1894.

SAIYID MUHAMMAD HADI, M. R.A.C., M.R.A.S.,
Assistant Director.

J. A. D'M.—P. No. 01294—25-6-94—410—29-9-94. Piece Dept.